REMARKS/ARGUMENTS

The rejection

Claims 1-16 and 28-38 have been rejected under 35 USC 103(a) as being unpatentable over Takahashi applied by itself and, also, over the combination of Takahashi in view of Kikuchi. Reconsideration and withdrawal of these rejections are respectfully requested in light of the following remarks.

Brief description of the invention

The present invention relates to a tire design having a reinforcing element. A steel cord is conventionally used in a pneumatic tire as a reinforcement element. Such a steel cord advantageously has mechanical properties that are very similar, i.e. symmetrical, in extension and in compression. Many attempts to replace the steel cord have been made, the motivation being inter alia to save weight and to lower rolling resistance. A prerequisite for the design of all reinforcement materials aimed to replace steel cords is to fulfill the mechanical properties of the steel cords, namely the symmetrical aspect of the properties.

It is not a challenge to design a monofilament elongate composite element of long high modulus and high tenacity fibers impregnated in a resin if the goal is only to yield the required mechanical properties in extension found in the use of steel cords. However, as explained on page 6 of the present specification, this property is insufficient to provide the requisite tire performance because "it is necessary to obtain a good combination between the properties of the resin, [and] of the reinforcement element ... The best results in flexion of the composite ... are obtained with fibers having mechanical properties which are balanced in traction and in compression". The particular structure of a monofilament elongate composite element made of unidirectional fibers

imbedded in a resin is, however, quite inadequate with respect to providing the required compressive mechanical properties. In contrast, the present invention provides a monofilament elongate composite element with symmetry in extension and in compression.

The Examiner's position regarding Takahashi

The Examiner concedes that Takahashi fails to disclose:

1. the claimed characteristics of the elongate composite element regarding the elastic deformation in compression (i.e. "said elongate composite element having an elastic deformation in compression at least equal to 2%"), and

2. the breaking stress in compression as compared to breaking stress in extension (i.e. "having in flexion a breaking stress in compression greater than the breaking stress in extension").

Nevertheless, the Examiner rejects claim 1 because

a. the undisclosed features are dependent on the particular resin and the particular fiber elements forming the composite element,

b. Takahashi discloses a resin "to form an elongate composite element in an analogous manner to that of the claimed invention", and

c. it would be obvious to form Takahashi's tire with an "elongate composite element having the claimed properties since the ... element of Takahashi is formed of a similar ... resin and would be expected to possess extremely similar properties as compared to the ... element of the claimed invention, there being no evidence of unique processing, other than choosing a high modulus, thermosetting resin, that results in the claimed ... element."

Arguments that Claim 1 is patentable over Takahashi

Claim 1, as originally filed, includes the feature of "substantially symmetrical technical fibers." Although the Examiner has explicitly recognized that certain ones of the claimed features are not found in Takahashi, no mention is made of this "symmetrical" design feature. As explained above, this is a salient feature of the present invention. In order to even further emphasize this feature, Claim 1 has been revised herein to incorporate thereinto the subject matter of Claim 5 (now canceled), namely that "said elongate composite element has an elastic deformation in extension which is substantially equal to the elastic deformation in compression."

Since Claim 1 has been augmented with the substance of Claim 5, it is appropriate to see what the Examiner has to say about Claim 5. On page 5 of the Official Action the Examiner concedes that "Takahashi is silent as to the elastic deformation in extension and compression." Nevertheless, the Examiner contends that Takahashi's resin is similar to the one claimed (same as b. above) and that therefore "one would have expected" Takahashi's element to have similar properties to the claimed element (same as c. above). The Examiner further contends that Takahashi "suggests some exemplary fiber materials, including carbon fibers, which are identified by the claimed invention as possible fiber materials."

As to the latter point, the Examiner is respectfully requested to specify where in the present application he allegedly found the "carbon fibers, which are identified by the claimed invention as possible fiber materials".

From the Examiner's cursory treatment of claim 5 it appears that the rejection thereof leaps from (i) an observation that Takahashi's resin is allegedly similar to the claimed resin, to (ii) the

expectation that the composite element would be similar as well, to (iii) a vague comment about a carbon fiber. The obscure logic behind the sequence of points made by the Examiner and how they lead to the conclusion that dismisses symmetry of the fiber as a patentably distinctive feature of the claimed tire escapes the undersigned. The Examiner repeatedly refers to the resin chosen by Takahashi, but ignores the differences between the fibers of the present invention and Takahashi. The Examiner seems to have overlooked the fact that patentability can rest on the selection of a particular fiber. Thus, the Examiner's reasoning, with all due respect, is flawed and appears to rely on hindsight based on the present invention.

Claim 1, as amended herein, includes at least the three distinctions over Takahashi that were conceded by the Examiner. The Examiner's position regarding distinctions 1 and 2 listed above is based solely on conjecture and supposition, whereas the key feature of symmetry has in actuality been ignored. It is respectfully submitted that these distinctive features, individually as well as in combination, serve to clearly and patentably distinguish claim 1 over Takahashi and, as such, the rejection must be withdrawn.

Argument that claim 1 is patentable over Takahashi in view of Kikuchi

Kikuchi is said by the Examiner to disclose an elongate composite element with an enhanced compression modulus "due to the use of an impregnating resin." This allegedly shows that "Kikuchi recognizes improved compression properties ..." However, this does not bridge the above-discussed gap between claim 1 and Takahashi. It does not teach or suggst the specific composite element properties conceded by the Examiner as being distinctive over Takahashi, nor does it even hint at the symmetry properties of the fiber. Accordingly, claim 1 is clearly patentable over a combination of these references.

Patentability of dependent claims 2-16

Claims 2-16 are dependent, either directly or indirectly, on claim 1 and, thus, each is allowable therewith. Moreover, these claims include additional features which even more clearly distinguish the present claimed invention patentably over Takahashi and Kikuchi. For example, claim 2 specifies that the symmetrical fibers are glass fibers. Once again, the Examiner concedes that this is not disclosed in Takahashi. Nevertheless, this feature is also dismissed on the basis that use of glass fibers is obvious because "glass fibers represent a well-known, organic material used in tire reinforcing elements, including elongate composite elements." However, glass fibers used in the present invention are NOT organic fibers, as alleged by the Examiner. They are mineral fibers. A mineral fiber is totally different from an organic fiber. Moreover, a contribution of the present invention to the prior art is the discovery that glass fibers alone embedded in a high modulus resin has the capability to endure the bending effects encountered during normal use of a tire. Neither one of the applied references discloses, teaches or even hints at such a combination of a glass fiber embedded in a high modulus resin. Thus, claim 2 is certainly patentable over Takahashi alone or in combination with Kikuchi.

Patentability of claim 28 over Takahashi alone or in view of Kikuchi

This claim recites a combination of glass fibers with a high modulus resin. In rejecting this claim, the Examiner mentions only the resin to the exclusion of the highly significant glass fibers. As explained in detail above in connection with Claim 2, the combination of glass fibers with a high modulus resin is not found in the prior art. Consequently, Claim 28 is allowable over the applied references.

Patentability of dependent claims 29-38

Claims 29-38 are dependent, either directly or indirectly, on claim 28 and, thus, each is allowable therewith. Moreover, these claims include additional features which serve to even more clearly distinguish the present claimed invention patentably over Takahashi and Kikuchi.

Other cited but not applied references

The references cited by the Examiner but not applied against the claims have been reviewed and found not to adversely affect the patentability of the present invention by way of teaching it or rendering it obvious.

Conclusion

Based on all of the above, it is respectfully submitted that the present application is now in proper condition for allowance. Prompt and favorable action to this effect is respectfully solicited.

Respectfully submitted,

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